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(54) RECORDER, RECORDING METHOD, PROGRAM, RECORDING MEDIUM AND IMAGE PICKUP DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To retrieve or sort files on a recording medium at a high speed and to judge erasure at a high speed.
SOLUTION: An entry property 2 included in entry properties identifies a normal and a

system. The normal means the entry of actual data and the system means the entry describing the definition of a flag. The flag indicates the attribute information of the file and the flag is defined by equipment or a user. The entry property 3 identifies validity and invalidity regarding the entries and the entry property 4 indicates whether or not the file registered to the entry refers to the other file. A referred counter indicates the number of the reference of the file from the other files. In the case that the file is referred to from the other file, a referring file list indicates the referring origin. By those pieces of information, reference relations among the files are described.

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CLAIMS

[Claim(s)]
[Claim 1] An index file is generated by relating with each of the live data of one or more

[above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It is the recording device which recorded the above-mentioned index file on the record medium. The recording device with which each attribute information on one or more [above] files is held in the above-mentioned index data, the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 2] The recording device characterized by one unit of the above-mentioned system information registering one convention of the above-mentioned attribute information in claim 1.

[Claim 3] The recording device with which it sets to claim 1 and one unit of the above-mentioned system information is characterized by registering two or more conventions of the above-mentioned attribute information.

[Claim 4] The recording device characterized by setting up beforehand 1 or two or more conventions of the above-mentioned attribute information in claim 1.

[Claim 5] The recording device characterized by 1 or two or more conventions of the above-mentioned attribute information being set up by the user in claim 1.

[Claim 6] It is the recording device characterized by recording the text relevant to the above-mentioned attribute information in claim 1 including text information, as for the above-mentioned system information.

[Claim 7] It is the recording device characterized by recording the image relevant to the above-mentioned attribute information in claim 1 including contraction image information, as for the above-mentioned system information.

[Claim 8] An index file is generated by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It is the record approach which records the above-mentioned index file on a record medium. The record approach by which each attribute information on one or more [above] files is held in the above-mentioned index data, the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 9] The record approach characterized by one unit of the above-mentioned system information registering one convention of the above-mentioned attribute information in claim 8.

[Claim 10] The record approach that it sets to claim 8 and one unit of the above-mentioned system information is characterized by registering two or more

conventions of the above-mentioned attribute information.

[Claim 11] The record approach characterized by setting up beforehand 1 or two or more conventions of the above-mentioned attribute information in claim 8.

[Claim 12] The record approach characterized by 1 or two or more conventions of the above-mentioned attribute information being set up by the user in claim 8.

[Claim 13] It is the record approach characterized by recording the text relevant to the above-mentioned attribute information in claim 8 including text information, as for the above-mentioned system information.

[Claim 14] It is the record approach characterized by recording the image relevant to the above-mentioned attribute information in claim 8 including contraction image information, as for the above-mentioned system information.

[Claim 15] An index file is generated by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It is the record approach which records the above-mentioned index file on a record medium. Each attribute information on one or more [above] files is held in the above-mentioned index data. The program for making a computer perform the record approach by which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 16] An index file is generated by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It is the record approach which records the above-mentioned index file on a record medium. Each attribute information on one or more [above] files is held in the above-mentioned index data. The record medium which recorded the program for making a computer perform the record approach by which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information and in which computer reading is possible.

[Claim 17] In the image pick-up equipment which records the picture signal which may have had the image of a photographic subject photoed on a record medium An index file is generated by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It has the index recording device which recorded the above-mentioned index file on the record medium. Image pick-up equipment with which

each attribute information on one or more [above] files is held in the above-mentioned index data, the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 18] The recording apparatus which held the reference relational data which is the recording apparatus which generates an index file and recorded the above-mentioned index file on the record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, and shows the reference relation of the above-mentioned multiple files to the above-mentioned index data.

[Claim 19] It is the recording device characterized by including the number with which the above-mentioned reference relational data is referred to from other files in claim 18.

[Claim 20] It is the recording device characterized by including the information which specifies the file to which the above-mentioned reference relational data is referring to the file in claim 18.

[Claim 21] It is the recording device which sets to claim 18 and is characterized by the above-mentioned reference relational data including the information on whether the file is referring to other files.

[Claim 22] or [that the file of the above-mentioned reference relational data is effective in claim 18] -- the recording device characterized by including the information on an invalid.

[Claim 23] The record approach which held the reference relational data which is the record approach which generates an index file and recorded the above-mentioned index file on the record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, and shows the reference relation of the above-mentioned multiple files to the above-mentioned index data.

[Claim 24] It is the record approach characterized by including the number with which the above-mentioned reference relational data is referred to from other files in claim 23.

[Claim 25] It is the record approach characterized by including the information which specifies the file to which the above-mentioned reference relational data is referring to the file in claim 23.

[Claim 26] It is the record approach which sets to claim 23 and is characterized by the above-mentioned reference relational data including the information on whether the file is referring to other files.

[Claim 27] or [that the file of the above-mentioned reference relational data is effective in claim 23] -- the record approach characterized by including the information on an invalid.

[Claim 28] The program for making a computer perform the record approach which held in the reference relational data which is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of the above-mentioned multiple-files file the index data concerning each of the multiple-files file recorded on the record medium, and holding them in the form of predetermined, and shows the reference relation of the above-mentioned multiple files to the above-mentioned index data.

[Claim 29] An index file is generated by relating with each of the live data of the above-mentioned multiple-files file the index data concerning each of the multiple-files file recorded on the record medium, and holding them in the form of predetermined. It is the record approach which records the above-mentioned index file on a record medium. The record medium which recorded the program for making a computer perform the record approach which held the reference relational data which shows the reference relation of the above-mentioned multiple files to the above-mentioned index data and in which computer reading is possible.

[Claim 30] In the image pick-up equipment which records the picture signal which may have had the image of a photographic subject photoed on a record medium An index file is generated by relating with each of the live data of the above-mentioned multiple-files file the index data concerning each of the multiple-files file recorded on the record medium, and holding them in the form of predetermined. Image pick-up equipment which held the reference relational data which is equipped with the index recording apparatus which recorded the above-mentioned index file on the record medium, and shows the reference relation of the above-mentioned multiple files to the above-mentioned index data.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the recording device which records the information which distinguishes a record medium especially on a record medium in the form of predetermined in the recording device which records image data, audio data, etc. on a record medium. This invention relates to the record approach, program, and record medium which are used for such a recording device. Furthermore, this invention relates to the electronic camera equipped with such a recording device.

[0002]

[Description of the Prior Art] For example, the configuration of the pocket mold video camera which considered the optical disk recording apparatus and the video camera as the configuration of one apparatus is proposed. In this recording apparatus, two or more data which recorded some scenes are recorded on an optical disk as a file.

[0003] Moreover, the record regenerative apparatus also having the function to reproduce and edit the recorded data is known by equipping such a recording device with the sound generating sections, such as displays, such as for example, a liquid crystal display panel and an organic electroluminescence display panel, and a loudspeaker.

[0004] In order to make easy processing whose user searches, the data, for example, the image data, of the request in the data currently recorded on the record medium, recording some images of two or more image data currently recorded, voice, etc. as management information (an index file being called), the position, for example, the most-inner-circumference field, of a disk-like record medium, is proposed.

[0005] An index file is a file which summarized the information for identifying the contents of one or more files recorded on the record medium. Attribute information and extract information are included in an index file. As an example, as for an index file, a property, a text, a thumbnail, and four kinds of data of an intro are held. A property is data in which the attribute of a title and each AV file is shown. Moreover, a text is data in which the character string of the title concerning each AV file is shown. The data of a thumbnail and an intro are one typical screen of a file, and typical audio data for about several seconds.

[0006]

[Problem(s) to be Solved by the Invention] When the index file is being used, in order to search how the file of arbitration is arranged or to sort it, it is necessary to analyze all the structures of an index file. When neither the access rate of a record medium nor the rate of an arithmetic unit is high speeds, there is a problem to which time amount until it displays a retrieval result or a sort result becomes long. Moreover, although the

attribute information on contents, such as an animation, a still picture, and an audio, can be depended for example, specified to a device or application, if attribute information is newly added while the amount of data will increase, if all various applications are specified, the problem which cannot distinguish new attribute information will occur by the device which uses the convention of the attribute information on past.

[0007] Moreover, when eliminating the file registered into the index file, the file which is referred to from other files and required cannot be eliminated. However, in order to investigate the reference relation of a file, it is necessary to analyze all actual files. The problem which requires time amount for this analysis and requires time amount for elimination actuation of a file arises.

[0008] Therefore, the purpose of this invention is to offer the record approach and recording device which can make more nearly high-speed processing which enables high-speed retrieval or a high-speed sort more, and eliminates a file. Moreover, the purpose of this invention is to offer the record medium which recorded the program and this program for making a computer perform such a record approach and in which computer reading is possible. furthermore, this invention will be boiled if the image pick-up equipment which adopts such a record approach is offered.

[0009]

[Means for Solving the Problem] Invention of claim 1 generates an index file by relating with each of the live data of one or more files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It is the recording device which recorded the index file on the record medium. Each attribute information on one or more files is held in index data, an index file has system information in addition to index data, and system information is the recording device which specified attribute information. Invention of claim 8 holds each attribute information on one or more files in index data, an index file has system information in addition to index data, and system information is the record approach which specified attribute information.

[0010] Invention of claim 15 generates an index file by relating with each of the live data of one or more files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. Are the record approach which records an index file on a record medium, and each attribute information on one or more files is held in index data. It is a program for making a computer perform the record approach by which an index file has system information in addition to index data, and system information specified attribute information.

Invention of claim 16 is a record medium which recorded such a program and in which computer reading is possible.

[0011] In the image pick-up equipment which records the picture signal with which invention of claim 17 may have had the image of a photographic subject photoed on a record medium An index file is generated by relating with each of the live data of one or more files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined. It has the index recording device which recorded the index file on the record medium. Each attribute information on one or more files is held in index data, an index file has system information in addition to index data, and system information is image pick-up equipment which specified attribute information.

[0012] By relating with each of the live data of multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, invention of claim 18 is the recording apparatus which generates an index file and recorded the index file on the record medium, and is the recording apparatus which held the reference relational data which shows the reference relation of multiple files to index data. Invention of claim 23 is the record approach which held the reference relational data which shows the reference relation of multiple files to index data.

[0013] Invention of claim 28 is the record approach which generates an index file and records an index file on a record medium, and is a program for making a computer perform the record approach which held the reference relational data which shows the reference relation of multiple files to index data by relating with each of the live data of a multiple-files file the index data concerning each of the multiple-files file recorded on the record medium, and holding them in the form of predetermined. Invention of claim 29 is a record medium which recorded such a program and in which computer reading is possible.

[0014] In the image pick-up equipment which records the picture signal with which invention of claim 30 may have had the image of a photographic subject photoed on a record medium An index file is generated by relating with each of the live data of a multiple-files file the index data concerning each of the multiple-files file recorded on the record medium, and holding them in the form of predetermined. It is image pick-up equipment which held the reference relational data which is equipped with the index recording apparatus which recorded the index file on the record medium, and shows the reference relation of multiple files to index data.

[0015] Since an index file has the system information which specifies each attribute

information on one or more files, the record medium which recorded the recording device by this invention, the record approach, the program, and this program, and image pick-up equipment equipped with this recording device can specify required attribute information, without increasing the amount of data of attribute information. For example, by having the information which defines attribute information, an old and new device can treat attribute information, and versatility can be improved. In this invention, high-speed retrieval or a high-speed sort is attained by using the attribute information on a file. For example, retrieval or a sort is attained only by extracting the entry 1 stands on the same bit position of a flag.

[0016] Since it can manage in the reference relation of a file, without accessing an actual file since the information which shows the reference relation of a file is included in entry management information with the record medium which recorded the recording device by this invention, the record approach, the program, and this program, and image pick-up equipment equipped with this recording device, the propriety of elimination can judge to a high speed and presentation of warning to a user can also make to a high speed. Furthermore, by having the information on effective/invalid of an entry, it is good without eliminating the entry corresponding to the time of file elimination, and rewriting of a record medium can limit to the minimum field, and can perform high-speed elimination processing. Moreover, by overwriting the entry added to the entry which detected and detected the entry of elimination treatment (invalid processing) based on the information on this effective/invalid, processing which changes the data of an entry and its management domain can be performed as it is unnecessary, and high-speed entry addition processing is attained.

[0017]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained based on a drawing. In addition, in each drawing, the explanation may be omitted about the same configuration. Drawing 1 is the block diagram showing the example of 1 configuration of the digital recording regenerative apparatus which can apply this invention. A digital recording regenerative apparatus is constituted by the video encoder 11, the audio encoder 12, the video decoder 13, the audio decoder 14, the file-generating machine 15, the file decoder 16, memory 17, memory 20, the memory controller 18, the system control microcomputer 19, the error correction sign / decoder 21, the drive control microcomputer 22, the data modulator and demodulator 23, the field modulation driver 24, a control unit 26, the servo circuit 30, a spindle motor 31, the field head 32, and the optical pickup 33. To a record medium (here magneto-optic disk) 40, digital data is recorded by the field head 32 and the optical pickup 33 by the field

modulation. Moreover, the recorded data are read from a record medium 40 by the optical pickup 33.

[0018] From a video input terminal, a video signal is supplied to the video encoder 11, and compression coding is carried out. From an audio input terminal, an audio signal is supplied to the audio encoder 12, and compression coding is carried out. Each output of the video encoder 11 and the audio encoder 12 is called an elementary storm.

[0019] With this operation gestalt, the camera one apparatus digital recording regenerative apparatus is equipped with the digital recording regenerative apparatus. The image by which the video signal was photoed with the video camera is supplied, and a video camera generates a video signal, when the image pick-up light of a photographic subject is supplied to image sensors, such as CCD (Charge Coupled Device), by optical system. The voice by which the audio signal was collected with the microphone is supplied.

[0020] The video encoder 11 is constituted by each electronic circuitry of an A/D converter, the format conversion section, the image sort section, a subtractor, the DCT section, the quantization section, the variable-length-coding section, buffer memory, a rate control section, the reverse quantization section, the reverse DCT section, an adder unit, video memory, the motion compensation prediction section, and a switch when for example, compression coding is MPEG.

[0021] After the video signal supplied to the video encoder 11 is digitized with an A/D converter, it is changed into the space resolution used by coding in the format conversion section, and is outputted to the image sort section. The image sort section rearranges the sequence of a picture into the order suitable for coding processing. That is, it rearranges into the order suitable for encoding I picture and P picture previously, and encoding B picture after that.

[0022] The output of the screen sort section is inputted into the DCT section through the subtraction section, and DCT coding is performed. The output of the DCT section is inputted into the quantization section, and is quantized with the predetermined number of bits. The output of the quantization section is inputted into the variable-length-coding section and the reverse quantization section. The variable-length-coding section is encoded with the variable-length sign which assigns a short code with data with the higher frequency of occurrence, for example, Huffman coding, and coded data is outputted to the buffer memory of memory. Buffer memory outputs coded data as an output of a video encoder at a fixed rate. Moreover, since the amount of signs generated in the variable-length-coding section is adjustable, a rate control section controls quantization actuation of the quantization section by

supervising buffer memory to maintain a predetermined bit rate.

[0023] On the other hand, since it is used as a reference screen in the motion compensation prediction section in the case of I picture and P picture, the signal inputted into the reverse quantization section from the quantization section is inputted into the reverse DCT section after reverse-quantizing, and reverse DCT is performed. The output of the reverse DCT section is added with the output of the motion compensation prediction section by the adder unit, and is inputted into video memory. The output of video memory is inputted into the motion compensation prediction section. The motion compensation prediction section performs front prediction, back prediction, and both-directions prediction, and outputs them to an adder unit and the subtraction section. These reverse quantization section, the reverse DCT section, an adder unit, video memory, and the motion compensation prediction section constitute the local decode section, and the same video signal as a video decoder is restored.

[0024] The subtraction section subtracts between the output of the image sort section, and the output of the motion compensation prediction section, and forms the prediction error between a video signal and the decode video signal decoded in the local decode section. With a switch, the subtraction section does not perform subtraction processing but, in the case of coding in a frame (I picture), data only pass it.

[0025] When it returns and explains to drawing 1 , the audio encoder 12 is equipped with each electronic circuitry, such as the sub-band-coding section and the adaptive-quantization bit quota section, and consists of cases of MPEG/Audio layer 1 / layer 2. It is divided into the subband signal of 32 bands in the sub-band-coding section, and quantizes according to mental acoustic-sense weighting in the adaptive-quantization bit quota section, and an audio signal is outputted after being formed in a bit stream.

[0026] In addition, in the case of the MPEG/Audio layer 3, in order to raise coding quality, the adaptation block length deformation discrete cosine transform section, the clinch distortion reduction butterfly section, the nonlinear quantization section, the variable-length-coding section, etc. are introduced further.

[0027] The output of the video encoder 11 and the output of the audio encoder 12 are supplied to the file-generating machine 15. Without using a specific hardware configuration, the file-generating machine 15 changes the DS of a video elementary stream and an audio elementary storm so that it may have the file structure which can treat an animation, voice, a text, etc. with the computer software which can be synchronized and reproduced. As for such software, QuickTime (it is hereafter written as "QT" suitably.) is known. Hereafter, the case where QT is used is explained. The

file-generating machine 15 multiplexes a coding video data and coding audio data. The file-generating machine 15 is controlled by the system control microcomputer 19.

[0028] The QuickTime movie file which is the output of the file-generating machine 15 is written in memory 17 one by one through the memory controller 18. The memory controller 18 will read a QuickTime movie file from memory 17, if the data writing from the system control microcomputer 19 to a record medium 40 is required.

[0029] Here, the transfer rate of QuickTime movie coding is set to a transfer rate lower than the write-in data transfer rate to a record medium 40, 1/2 [for example,]. therefore, a QuickTime movie file is continuously written in memory 17 -- receiving -- read-out of the QuickTime movie file from memory 17 -- memory 17 -- overflow -- or it is carried out intermittently, being supervised with the system control microcomputer 19 so that an underflow may not be carried out.

[0030] The QuickTime movie file read from memory 17 is supplied to an error correction sign / decoder 21 from the memory controller 18. An error correction sign / decoder 21 once writes this QuickTime movie file in memory 20, and generates the redundancy data of an interleave (interleaved) and an error correction sign. An error correction sign / decoder 21 reads the data with which redundancy data were added from memory 20, and supplies this to the data modulator and demodulator 23.

[0031] In case the data modulator and demodulator 23 record digital data on a record medium 40, they make easy the clock extract at the time of playback, and they modulate data so that problems, such as an intersymbol interference, may not arise. For example, a RLL (1 7) (run length limited) sign, a trellis sign, etc. can be used.

[0032] The output of the data modulator and demodulator 23 is supplied to the field modulation driver 24 and an optical pickup 33. According to an input signal, the field modulation driver 24 drives the field head 32, and impresses a field to a record medium 40. An optical pickup 33 irradiates the laser beam for record at a record medium 40 according to an input signal. Data are recorded on a record medium 40 by the field modulation technique.

[0033] A record medium 40 is a disk-like record medium, for example, is magneto-optic-disk (MO, magneto-optical disk) ******. In addition to a magneto-optic disk, the rewritable disk-like record medium of a phase change mold disk, a magnetic disk, etc. can be used.

[0034] Here, as for the index file mentioned later, it is desirable to be recorded on the substantial most inner circumference in a disk-like record medium, for example, the record part following a lead-in groove, from a viewpoint of the ease of read-out.

[0035] With this operation gestalt, comparatively minor diameter disks, such as MO of

about 4cm, for example, a diameter, a diameter of about 5cm, a diameter of about 6.5cm, or a diameter of about 8cm, are used. A record medium 40 rotates by the motor 31 in a constant linear velocity (CLV), a constant angular velocity (CAV), or Zone CLV (ZCLV).

[0036] The drive control microcomputer 22 outputs a signal to the servo circuit 30 according to the demand of the system control microcomputer 19. The servo circuit 30 controls the whole drive by controlling a spindle motor 31 and an optical pickup 33 according to this output. For example, to an optical pickup 33, the servo circuit 30 performs the migration servo, tracking servo, and focus servo of the direction of a path of a record medium 40, and controls rotation of a spindle motor 31. Moreover, the control unit 26 into which a user inputs predetermined directions is connected to the system control microcomputer 19.

[0037] In the case of playback, an optical pickup 33 irradiates a laser beam with the output for playback at a record medium 40, and acquires a regenerative signal by receiving the reflected light with the photodetector in an optical pickup 33. In this case, the drive control microcomputer 22 controls an optical pickup 33 by the servo circuit 30 so that a tracking error and a focal error are detected from the output signal of the photodetector in an optical pickup 33, and the laser beam of reading is located on a truck and focuses on a truck. Furthermore, the drive control microcomputer 22 also controls the migration in the direction of a path of an optical pickup, in order to reproduce the data of the location of the request on a record medium 40. Like the time of record, with the system control microcomputer 19, a signal is given to the drive control microcomputer 22 and a desired location is determined as it.

[0038] The regenerative signal of an optical pickup 33 is supplied to the data modulator and demodulator 23, and it restores to it. The data to which it restored are supplied to an error correction sign / decoder 21, playback data are once stored in memory 20, and the QuickTime movie file after an error correction to which a day interleave (deinterleaved) and an error correction are performed is stored in memory 17 through the memory controller 18.

[0039] The QuickTime movie file stored in memory 17 is outputted to the file decoder 16 according to the demand of the system control microcomputer 19. in order that the system control microcomputer 19 may carry out continuation playback of a video signal and the audio signal, the regenerative signal of a record medium 40 supervises the amount of data stored in memory 17, and the amount of data which is read from memory 17 and supplied to the file decoder 16 -- memory 17 -- overflow -- or the memory controller 18 and the drive control microcomputer 22 are controlled not to carry out an underflow. In this way, the system control microcomputer 19 reads data from a record

medium 40 intermittently.

[0040] The file decoder 16 divides a QuickTime movie file into a video elementary stream and an audio elementary file under control of the system control microcomputer 19. The video decoder 13 is supplied, decode of compression coding is performed, and a video elementary stream serves as a video outlet, and is outputted from a video outlet terminal. The audio decoder 14 is supplied, decode of compression coding is performed, and an audio elementary stream serves as an audio output, and is outputted from an audio output terminal. Here, the file decoder 16 is outputted so that a video elementary stream and an audio elementary stream may synchronize.

[0041] The video decoder 13 is equipped with each electronic circuitry of the buffer memory of memory, the variable-length sign decode section, the reverse quantization section, the reverse DCT section, an adder unit, video memory, the motion compensation prediction section, the screen sort section, and a digital to analog converter (it is hereafter written as "D/A".), and consists of cases of MPEG. A video elementary storm is once accumulated in buffer memory, and is inputted into the variable-length decode section. Macro block encoded information is decoded and, as for the variable-length decode section, prediction mode, a motion vector, quantization information, and a quantization DCT multiplier are separated. It is restored to a DCT multiplier in the reverse quantization section, and a quantization DCT multiplier is changed into pixel space data in the reverse DCT section. Although the output of the reverse quantization section and the output of the motion compensation prediction section are added, an adder unit is not added when decoding I picture. All macro blocks in a screen are decoded, and a screen is rearranged into the original entry sequence foreword in the screen sort section, and is changed and outputted to an analog signal by D/A. Moreover, since the output of an adder is used as a reference screen by subsequent decode processing in the case of I picture and P picture, it is accumulated in video memory and outputted to the motion compensation prediction section.

[0042] The audio decoder 14 is equipped with each electronic circuitry, such as the bit stream decomposition section, the reverse quantization section, and the subband composition filter bank section, and consists of cases of the MPEG/Audio layer 1/a layer 2. The inputted audio elementary stream is divided into a header, auxiliary information, and a quantization subband signal in the bit stream decomposition section, and it reverse-quantizes with the number of bits assigned in the reverse quantization section, and a quantization subband signal is outputted after being compounded by the subband composition filter bank.

[0043] Drawing 2 is the mimetic diagram showing the appearance of a camera one

apparatus digital recording regenerative apparatus. The camera one apparatus digital recording regenerative apparatus 50 is equipped with a body 51, the lens section 52, the sound-collecting microphone 53, and a display panel 54, and is constituted. The digital recording regenerative apparatus shown in drawing 1 is stored in a body 51. Through the optical system of the lens section 52, the image pick-up light of a photographic subject is supplied to an image sensor, and a video signal is generated. An audio signal is generated by the sound-collecting microphone 53. The display corresponding to a playback image or the contents of actuation in a display panel 54 etc. is performed. A display panel 54 is equipped with a liquid crystal display and a piezoelectric device, and is constituted. A user inputs desired actuation by pressing a part for a display with a pointing device 55.

[0044] A display panel 54 displays the monitor image at the time of photography, or is used for displaying the playback image of a record medium. Furthermore, it is displayed on a display panel 54, the image information (Thumbnail Picture), for example, the thumbnail image, currently recorded as an index file. Specifically, two or more thumbnails are displayed on a display panel 54 in line. Since the number of sheets of the thumbnail which can be displayed on a display panel 54 at once is restrained, scrolling of a thumbnail of it is enabled by the key stroke prepared in the scrolling key or body 51 displayed on a display panel 54. And it is made as [reproduce / the file treating the image data and audio data corresponding to the specified thumbnail] by specifying with the desired thing pointing device 55 or desired cursor among thumbnails.

[0045] Such a camera one apparatus digital recording regenerative apparatus 50 generates the extract information on a file the time of formatting a record medium, after photography, etc. With this operation gestalt, an index file is generated in the form of for example, a QuickTime movie file. By generating in the form of a QuickTime movie file, two or more live data, such as image data and audio data, and the extract information on a file can be recorded in the same format, and a record regenerative apparatus can reproduce all by QT.

[0046] Hereafter, it outlines about a QuickTime movie file. QT is software which manages various data along with a time-axis, and is OS extension for reproducing an animation, voice, a text, etc. synchronously, without using special hardware. QT is "INSIDE MACINTOSH. It is indicated by :QuickTime (Japanese version) (horse mackerel SONU S loess)" etc.

[0047] The fundamental data unit of QT movie resource is called an atom (atom), and each atom includes size and type information with the data. Moreover, the smallest unit

of data is treated as a sample (sample), and a chunk (chunk) is defined by QT as a set of a sample.

[0048] Drawing 3 is drawing showing the example of 1 configuration of a QuickTime movie file. Drawing 4 is drawing showing the example of 1 configuration of a video media information atom. Drawing 4 serves as drawing having shown more the video media information atom in drawing 3 in the detail, and the case where a truck is video information is shown.

[0049] In drawing 3 and drawing 4 , a QuickTime movie file consists of two parts, a movie atom (movie atom) 101, and a movie data atom (movie data atom) 102 greatly. The movie atom 101 is a part which stores information required in order to refer to information and live data required in order to reproduce the file. The movie data atom 102 is a part which stores live data, such as a video data and audio data.

[0050] The movie atom 101 contains the movie header atom (movie header atom) 111 which holds the information about the whole movie, the movie clipping atom (movie clipping atom) 112 which specifies a clipping region, the user definition data atoms 113 and 1, or two or more truck atoms (track atom) 114.

[0051] The truck atom 114 is prepared for every truck in a movie. The truck atom 114 describes the information about each data of the movie data atom 102 to the track header atom (track header atom) 131, the truck clipping atom (track clipping atom) 132, the truck mat atom (track matte atom) 133, the edit atom (edit atom) 134, and the media atom (media atom) 135. In drawing 3 , the truck atom 114-1 of one video movie is shown, and other truck atoms are omitted.

[0052] The media atom 135 describes the information which specifies the component which interprets data and media data of a movie truck to the media header atom (media header atom) 144, a media information atom (media information atom) (drawing 3 and drawing 4 video media information atom 145), and the media handler reference atom (media handler reference atom) 146.

[0053] The information on a media information atom is used for a media handler, and it performs mapping to media data from media time amount.

[0054] The media information atom 145 contains the data handler reference atom (data handler reference atom) 161, a media information header atom (media information header atom), the data-information atom (data information atom) 163, and the sample table atom (sample table atom) 164.

[0055] The information which a media information header atom (drawing 4 video media information header atom 162) requires for media is described. The information which the data handler reference atom 161 requires for the handling of media data is

described, and the information for specifying the data handler component which offers the access means to media data is included. As for the data-information atom 163, the information about data is described including a data reference atom (data reference atom).

[0056] The sample table atom 164 includes information required in order to change media time amount into the sample number which points out a sample location. The sample table atom 164 Sample size atom () [sample] size atom172, the time amount sample atom (time-to-sample atom) 173, the synchronous sample atom (sync sample atom) 174, a sample disk RIPUSHON atom () [sample] description atom175, the sample chunk atom (sample-to-chunk atom) 176, and the chunk offset atom (chunk offset atom) 177 -- and It is the case where it consists of shadow synchronous atoms (shadow syncatom) 178.

[0057] As for the sample size atom 172, the magnitude of a sample is described. As for the time amount sample atom 173, the relation between whether the data for how many seconds are recorded, and the sample and the time-axis ? is described. The information which the synchronous sample atom 174 requires for a synchronization is described, and the key frame in media is specified. A key frame is a frame of the self-endocyst mold independent of the frame to precede. Information required in order that the sample disk RIPUSHON atom 175 may decode the sample in media (decode) is saved. Media can have one or more sample disk RIPUSHON atoms according to the class of compression type used within the media concerned.

[0058] The sample chunk atom 176 is referring to the table in the sample disk RIPUSHON atom 175, and identifies sample disk RIPUSHON corresponding to each sample in media. The relation between a sample and a chunk is described and, as for the sample chunk atom 176, the sample location in media is identified based on the measurement size per a head chunk and chunk, and the information on sample disk RIPUSHON ID (sample description-ID). The start bit location of the chunk within movie data is described, and, as for the chunk offset atom 177, the location of each chunk in a data stream is specified.

[0059] Moreover, the chunk to which the audio data encoded by the predetermined compression coding method and the image data encoded by the predetermined compression coding method change from the sample of a predetermined number to the movie data atom 102 by drawing 3 , respectively, for example is stored as a unit. In addition, data do not necessarily have to carry out compression coding and can also store linear data. And for example, when treating a text, MIDI, etc., corresponding to ******** and this, a text truck, a MIDI truck, etc. are included for live data, such as a

text and MIDI, in the movie data atom 102 at the movie atom 101. Each truck in the movie atom 101 and the data stored in the movie data atom 102 are matched.

[0060] In such a layered structure, when reproducing the data in the movie data atom 102, QT follows a hierarchy one by one from the movie atom 101, develops a sample table in memory based on each atoms 172-178 in the sample table atom 164, and identifies the relation between each data. And QT reproduces data based on the relation between each data.

[0061] Since QT is such DS, the index file of this operation gestalt holds the live data of the extract information on a file in a movie data atom, and holds the management information of these live data in a movie atom. The movie data atom of this index file is hereafter called an index data atom, and a movie atom is called an index atom.

[0062] Here, although it is dependent on the data with which the file recorded on a record medium treats an index file, with this operation gestalt, the data of a file are image data and audio data. Moreover, such a file is hereafter written as "AV file."

[0063] Thus, when AV file is recorded on the record medium, as for an index file, a property, a text, a thumbnail, and four kinds of data of an intro are held. A property is data in which the attribute of each AV file is shown, and also has the information which refers to the live data of AV file. In an index file, only the property which holds attribute information is an indispensable file. A text is data in which the character string of the title concerning each AV file is shown. A thumbnail is the typical image data of one sheet of each AV file. Although a user can give arbitration, you may set the thumbnail of AV file automatically, for example so that it may consider as the image data of the 1st sheet of the beginning in the AV file concerned.

[0064] An intro is audio data of the typical short time of each AV file. Although a user can give arbitration, you may set the intro of AV file automatically, for example so that it may consider as the audio data for [of the beginning in the AV file concerned] several seconds (for example, for 5 seconds). As for these titles, a thumbnail, and an intro, a hold field is prepared for an index file after taking the facilities of retrieval etc. into consideration if needed. Moreover, although the data of a property need to be registered, though a title, a thumbnail, and each hold field of an intro were secured, no data of a title, a thumbnail, and an intro not necessarily need to be registered.

[0065] Drawing 5 is drawing showing an example of the index file created using a QuickTime movie file. An index file is constituted by the index atom 201 and the index data atom 202 in drawing 5 .

[0066] The live data of a property, a text, a thumbnail, and an intro are held in the index data atom 202. And the live data 231, 232, 233, and 234 of the property concerning each

AV file, a text, a thumbnail, and an intro are held in entry #1 which is each field 1st after the index data atom 202 - entry #n (n is two or more integers), respectively.

[0067] The index atom 201 consists of the truck atom (property) 212, a truck atom (text) 213, a truck atom (thumbnail) 214, and a truck atom (intro) 215 respectively corresponding to the live data of the movie header atom 211, a property and a text, a thumbnail, and an intro. In addition, as mentioned above, only the truck atom (property) 212 and the live data 231 of a property are indispensable.

[0068] Drawing 6 is drawing showing an example of a truck atom (property). In drawing 6 the truck atom (property) 212 Defined as a chunk concerning the property data corresponding to each AV file. AV file property #1, AV file property #2, ..., each of AV file property #n -- data length L_PR1, L_PR2, ..., L_PRn and the start byte location 0, L_PR1, L_PR1+L_PR2, ..., L_PR1+ ... it considers as the format of a table which shows +L_PRn -1, respectively. A data length is variable length displayed for example, per cutting tool.

[0069] in addition, the live data of a truck atom (text), a truck atom (thumbnail), a truck atom (intro), and a text, the live data of a thumbnail, and the live data of an intro -- respectively -- ** -- also let relation be the same thing as the truck atom (property) mentioned above and the relation of the live data of a property.

[0070] Drawing 7 is drawing showing an example of the live data of a property. The live data of a property consist of entry management information and file attribute information. Entry management information is the information for managing the entry itself, and consists of an entry number (entry number), an entry property (entry property), and a folder property (folder property).

[0071] An entry number is a number which begins from 0, and is a unique number within an index file. An entry number shows whether the live data of the property concerned are held in which entry. An entry number is 4 bytes of data which make the 0th byte a start byte location. The camera one apparatus digital recording regenerative apparatus 50 can find out the field in which the disk title is held in the index file by searching this entry number.

[0072] An entry property is 1 byte of data which make the 4th byte a start byte location, the attribute of an entry and a condition are shown and the entry property 1 1 bit each, the entry property 2, the entry property 3, and the entry property 4 are contained.

[0073] That is, the entry property 1 performs discernment of (0:folder and 1:file), and the entry property 2 performs discernment of (0:Normal and 1:system). Normal means the entry of the live data of the property mentioned above, and a system means the entry the definition of the flag mentioned later is described to be. A folder property is 4

bytes of data which make the 5th byte a start byte location, and shows the folder to which the entry belongs.

[0074] The entry property 3 performs discernment about an entry (0: validity, 1:invalid), and the entry property 4 shows whether the file registered into the entry is referring to other files, and it performs discernment (0: reference nothing and with 1: reference).

[0075] File attribute information A version (version), a flag (flags), A data type (data type), manufacture time (creation time), Edit time (modification time), DEYURESHON (duration), A file identification child (binary file identifier), It is constituted by a RIFADO counter (referred counter), a RIFA ring file list (referring file list), and the URL file identifier (URL file identifier).

[0076] A version is 1 byte of data which make the 9th byte a start byte location, and is the version number of the file registered into the entry. A flag is 2 bytes of data which make the 10th byte a start byte location, and is for identifying the attribute of a file. A data type is 1 byte of data which make the 12th byte a start byte location, and shows the classes (an animation, a still picture, audio, etc.) of data in the title file or AV file concerning the property concerned.

[0077] Manufacture time is 4 bytes of data which show the time by which the title file concerning the property concerned or AV file was manufactured, and make the 13th byte a start byte location. Edit time is 4 bytes of data which show the time in which the title file concerning the property concerned or AV file was corrected, and make the 17th byte a start byte location. DEYURESHON is 4 bytes of data which show the die length of the time amount needed since the title file concerning the property concerned or AV file is reproduced, and make the 21st byte a start byte location. A file identification child is binary data in which the whereabouts of the file concerning the property concerned is shown, and is 6 bytes of data which make the 25th byte a start byte location.

[0078] A RIFADO counter is 4 bytes of data with which a file shows the number currently referred to from another file, and makes the 31st byte a start byte location. A RIFA ring file list is data of variable length L RF which show the reference origin and make the 35th byte a start byte location, when the file is referred to from another file. ID a RIFA ring file list indicates an entry number or the whereabouts of an actual file to be is described. A URL file identifier is data of the URL format which shows the whereabouts of a file, and is data of variable length L FI which make a cutting tool (35+L RF) eye a start byte location.

[0079] By the entry management information mentioned above, it can have an imagination layered structure as shown in drawing 8 . Drawing 8 A is an example of the entry management information extracted from each property information on two or

more entries from #0 to #8, and drawing 8 B shows the layered structure expressed by the entry management information shown in drawing 8 A. Hereafter, management of AV file by entry management information is explained.

[0080] In the example of drawing 8 , by the entry property 1 and the entry property 2, #0 of an entry number, #3, and #4 are folders, #1, #5, #6, and #7 are files and it is shown that #2 and #8 are system information. Entry #2 and #8 are not contained in a hierarchy. Moreover, it is shown by the folder property that the high order of entry number #1 and #3 is the folder of entry number #0, it is shown that the high order of entry number #4 and #5 is the folder of entry number #3, and it is shown that the high order of entry number #6 and #7 is the folder of entry number #4. Therefore, the layered structure shown in drawing 8 B by such entry management information is specified.

[0081] As drawing 9 A shows an index file and shows it to drawing 9 A, entry #2 which are system information, and #8 are constituted by a property, a text, and the data of a thumbnail like the entry of other Normal. Since an intro is not indispensable, in drawing 9 B, entry #2 of system information and #8 do not have data of an intro. And the entry of a system is managed like the entry of other Normal with the truck atom (property) 212 of the index atom 201, the truck atom (text) 213, and the truck atom (thumbnail) 214. Drawing 9 B samples and shows a part of property information from #0 to #8 of an entry, and is the same as that of drawing 8 A.

[0082] Drawing 10 shows the example holding the information on a flag in entry #2 which are the information on a system. A flag is 2 bytes (16 bits) and the semantics of a flag is specified according to the bit position where 1 is set. Therefore, a flag can define 16 kinds of attributes at the maximum. The maximum number which can be defined can be restricted suitably. In the example of drawing 10 , the 4th bit is set to 1 from the 1st byte of head (MSB) of a flag. The value of a flag is 0x1000 (0x are a notation showing a hexadecimal). In this case, the data of a text are made into "BASEBALL" and let the data of a thumbnail be a thumbnail (icon) relevant to baseball.

[0083] Drawing 11 shows the example holding the information on a flag in entry #8 which are the information on a system. In the example of drawing 11 , the 8th bit is set to 1 from the 1st byte of MSB. The value of a flag is 0x0100. In this case, the data of a text are made into "SKI" and let the data of a thumbnail be a thumbnail (icon) relevant to skiing.

[0084] The example shown in drawing 10 and drawing 11 defines the 1-bit semantics of a flag by one entry. You may make it one entry, #2 [for example,], define the semantics of plurality, for example, a 2-bit flag, as shown in drawing 12 . For example, the 4th and the 8th bit are set to 1 from the 1st byte of MSB, respectively. The value of a flag is

0x1100. In this case, text data is made into "BASEBALL" and "SKI", and the data of the thumbnail of two sheets with the thumbnail (icon) relevant to the thumbnail (icon) relevant to baseball and skiing are recorded.

[0085] Thus, when defining two or more bits of a flag in one entry, the correspondence relation between a flag, a text, and a thumbnail is decided beforehand. For example, it is made as [arrange / in an order from the bit by the side of MSB of a flag / each of a text and a thumbnail]. In the case of a text, text information is recorded on a break and each break in order with the number of alphabetic characters of arbitration. Or two or more texts may be distinguished by embedding a tag using a description language like HTML (Hyper Text Markup Language). The Ruhr of whether it is made to correspond from the picture with which which pixel of the actually stored thumbnail constitutes one picture, and a thumbnail also has it in which location can be prepared, the positional information of a pixel can be stored using the tag of a text, or storing in the comment information on a thumbnail can also respond.

[0086] Drawing 13 shows the approach of arrangement of a file in case entry #2 define the 2-bit semantics of a flag. Drawing 13 A shows the entry management information and the flags from entry #0 to #7. This entry management information (an entry number, the entry property 1, the entry property 2, folder property) is the same as that of the information from entry #0 in drawing 8 or drawing 9 to #7. Moreover, entry #2 are system information, a flag is set to 0x1100, and as explained with reference to drawing 12 , they hold the information on the definition of two flags.

[0087] The flag of entry #1 which is a file is 0, and this attribute of file #1 is not specified. By the flag 0x1000, the attribute of the file of entry #5 is specified as "BASEBALL". Both the flags of entry #6 and #7 are set to 0x0100. This flag shows that an attribute is "SKI".

[0088] The layered structure shown in drawing 13 B is prescribed by the entry management information shown in drawing 13 A mentioned above, and the flag. A flag can prescribe the attribute information on a file. Therefore, when playing, the record medium, for example, the optical disk, with which the index file was recorded, only the thing of the attribute specified in the index file can be displayed by specifying the file attribute specified with a flag, for example. Furthermore, AV file corresponding to the specified index file can be specified by specifying a desired thing in the index file currently displayed. Therefore, it can search at a high speed AV filing [which a user wishes]. Furthermore, since system information describes the definition of a flag, there is an advantage whose amount of data does not increase that what is necessary is just to define the required range. Moreover, the definitions of a flag may differ for every record

medium, and there is an advantage excellent in versatility.

[0089] In addition, both the approach a device has beforehand the system information which defines a flag, and the approach the user itself sets the definition of a flag as a list are employable. For example, since 2 bytes is prepared as a flag, 1 byte is assigned to the flag defined by image pick-up equipment equipped with the device, for example, an optical disk record regenerative apparatus, and you may make it assign the flag with which a user can define other 1 byte with 1 operation gestalt.

[0090] Next, how to show the reference relation of an entry is explained using a part of entry management information and attribute information on a file. Drawing 14 A shows an example of property information required to show the reference relation of the entries from entry #0 to entry #7. Into an entry property (1 byte), from the entry property 1 to the entry property 4 is specified. The entry property 1 is used for discernment of a file and a folder, and the entry property 2 is used for discernment from the Normal information and system information. The folder property shows the folder of a high order. These entry properties 1 and 2 and a folder property are the same as that of what was mentioned above.

[0091] The entry property 3 performs discernment about an entry (0: validity, 1:invalid), and the entry property 4 shows whether the file registered into the entry is referring to other files, and it performs discernment (0: reference nothing and with 1: reference). A RIFADO counter shows the number with which the file is referred to from another file, and a RIFA ring file list shows the reference origin, when the file is referred to from another file.

[0092] In the example of drawing 14 A, all entries are effective, and since the file by which the entry property 3 was altogether set to 0, and was registered into entry #5 and #6 is referring to other files, the entry property 4 of entry #5 and #6 is set to 1. Moreover, the RIFADO counter of entry #1 is set to 2, and is referred to from two files. Two files of a referring to agency are files registered into entry #5 shown in the RIFA ring file list, and #6, respectively.

[0093] AV file registered into entry #1 is considered as the AV file A, and AV file registered into entry #5, #6, and #7, respectively is considered as the AV files B, C, and D. The information on the property shown in drawing 14 A and the reference relation of files as shown in drawing 14 B correspond. That is, since the file A to which it registered with entry #5 and #6, respectively, and Files C and D were registered into entry #1 is referred to, the entry property 4 of entry #5 and #6 is set to 1, respectively, the RIFADO counter of entry #1 is set to 2, and the RIFA ring file list of entry #1 has become 5 and 6.

[0094] In AV file currently recorded on the record medium, when it is going to delete a

certain AV file, AV file currently referred to from other AV files cannot be deleted. Other than this, the value of the RIFADO counter in the attribute information on a file can judge this by or in 0. In the example of drawing 14 , the value of the RIFADO counter of the AV file A is 2, and it turns out that this file A cannot be deleted.

[0095] When AV file is deleted, two kinds of approaches are possible for how an entry is processed. One approach is an approach of actually deleting entry #6, when the AV file C is deleted as shown in drawing 15 for example. Other approaches are approaches of changing the value of the entry property 3 of entry #6 into the value (1) meaning an invalid without deleting entry #6, as shown in drawing 16 . Which approach may be used.

[0096] The method of actually deleting an entry with deletion of AV file is the field of the capacity of a record medium, and is advantageous as compared with the approach of not deleting an entry. Since it is necessary to rewrite not only the live data of an entry but a truck atom, if it sees from the point of the processing time, the method of actually deleting an entry is disadvantageous as compared with the approach of not deleting an entry.

[0097] File deletion is explained with reference to drawing 17 . This processing is made by control of that system controller (microcomputer) in the explained camera one apparatus digital recording regenerative apparatus which carried out drawing 2 reference, for example. In the first step S1, deletion of File (AV file) x is chosen in a file list display. For example, the file x to delete from the list of the files currently displayed on the display panel (refer to drawing 2), two or more thumbnails which divide a screen and are displayed is chosen.

[0098] At step S2, it is judged for the value of the RIFADO counter of an entry with which File x is registered in the index file whether it is 0. Since it means that other files are referring to File x when it is not 0 and File x cannot be deleted, exception handling is made (step S3). For example, the message of the purport which cannot be deleted is displayed to a user.

[0099] If the value of a RIFADO counter is judged at step S2 to be 0, in step S4, it will be judged for the value of the entry property 4 whether it is 1. That is, it is determined whether File x is referring to other files. In the case of the entry property 4= 1, in step S5, the entry whose RIFA ring file list is the entry number (it may be ID of File x) of File x, i.e., the entry currently referred to by File x, is looked for.

[0100] The existence of such an entry is determined at step S6. In the case where it is judged with there being no entry, exception handling is made in step S7. For example, a user is shown the message of a purport with the mismatching of data. In step S4, since

the entry property 4 was 1, originally the entry which File x is referring to should exist. Nevertheless, that there is such no entry means that the mismatching of data exists.

[0101] If judged with there being an entry currently referred to by File x in step S6, at step S8, the decrement of the value of the RIFADO counter of the entry will be carried out. And in step S9, the entry number (there is also a case of ID of File x) of File x is deleted from a RIFA ring file list.

[0102] Next, it is judged in step S10 whether the entry of File x is deleted. In processing of drawing 17 , when deleting the AV file x, it is supposed that it is possible to choose whether an entry [/ in an index file] is actually deleted. For example, it is made as [choose / from the amount of the remaining availabilities of a record medium / processing]. By the case where there are many remaining availabilities, the method of not deleting an entry is chosen and the method of actually deleting an entry is chosen by the case where there are few remaining availabilities.

[0103] If the processing which deletes the entry corresponding to File x is chosen in step S10, as shown in drawing 15 , in step S11, the entry which corresponds from an index data atom will be deleted, the data after the entry deleted in step S12 will be moved, and the vacant logic space will be filled. And in step S13, the data of a management file are updated in an index atom. In the case where not deleting the entry corresponding to File x is determined in step S10, the value of the entry property 3 of the entry is updated to 1 (an invalid entry is meant) in step S15.

[0104] The processing to steps S13 or S15 is rewriting processing of the data on the semiconductor memory with which the system controller of a system, for example, a camera one apparatus digital recording regenerative apparatus, was equipped. And just before ejecting a record medium, the data of a record medium are updated as the suitable timing for every fixed time amount is also (step S14). That is, renewal of the index file on a record medium is performed in deletion of the AV file x on a record medium, and a list.

[0105] Next, the processing which adds an entry newly is explained with reference to drawing 18 after deletion of a file. Additional processing of File X is started at step S21. In step S22, the entry indicated to be an invalid by the entry property 3 is looked for. Here, the value of the entry property 3 is prescribed that the entry of 1 is invalid.

[0106] If there is an entry of an invalid and it will be determined in step S22, a new entry will be overwritten by the field of an invalid entry in step S23. Drawing 19 shows processing in case entry #6 are an invalid entry. It is unnecessary to rewrite the index atom which is the management data in an index file.

[0107] On the other hand, if it is determined in step S22 that there is no invalid entry, in

step S25, new entry information will be added to the location of the arbitration of an index file. At step S26, it is updated so that the entry to which the management information for every truck of an index atom was added may be specified. Drawing 20 shows the processing which adds an entry new as entry #n.

[0108] The processing to steps S23 or S26 is rewriting processing of the data on the semiconductor memory with which the system controller of a system, for example, a camera one apparatus digital recording regenerative apparatus, was equipped. And just before ejecting a record medium, the data of a record medium are updated as the suitable timing for every fixed time amount is also (step S24).

[0109] Thus, reference relation can be managed and the propriety of elimination can be judged at a high speed without accessing an actual file, since property information has the reference-related information of a file.

[0110] The various deformation and the application within limits which there are not and do not deviate from the summary of this invention are possible for this invention what is limited to 1 operation gestalt of this invention mentioned above. For example, this invention can apply a digital audio signal also to the case where record playback is carried out. For example, you may make it identify the genres (a classic, jazz, a lock, popular music, etc.) of AV file (musical piece data) with a flag. Moreover, when defining the attribute information described by the flag, it is related with the range of the whole index file, and attribute information may be defined or you may make it define attribute information in some predetermined range of an index file. Furthermore, although the explanation mentioned above described the example which uses QuickTime, this invention may be applied when using other application software.

[0111]

[Effect of the Invention] The record medium which recorded the recording device concerning this invention, the record approach, the program, and this program, and an electronic camera equipped with this recording device can hold the information which defines attribute information (flag) as a part of property information in an index file. Required attribute information can be specified by it, without increasing the amount of data of attribute information. For example, in consideration of the class of device, attribute information can be specified for every device. Moreover, by having the information which defines attribute information, an old and new device can treat attribute information, and versatility can be improved.

[0112] In this invention, high-speed retrieval or a high-speed sort is attained by using the attribute information on a file. For example, retrieval or a sort is attained only by extracting the entry 1 stands on the same bit position of a flag.

[0113] In this invention, since the reference relation of a file can be managed without accessing an actual file since the information which shows the reference relation of a file is included in entry management information, the propriety of elimination can be judged at a high speed and presentation of warning to a user can also be made at a high speed. Furthermore, by having the information on effective/invalid of an entry, it is good without eliminating the entry corresponding to the time of file elimination, and rewriting of a record medium can limit to the minimum field, and can perform high-speed elimination processing. Moreover, by overwriting the entry added to the entry which detected and detected the entry of elimination treatment (invalid processing) based on the information on this effective/invalid, processing which changes the data of an entry and its management domain can be performed as it is unnecessary, and high-speed entry addition processing is attained.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the example of 1 configuration of the digital recording regenerative apparatus which can apply this invention.

[Drawing 2] It is the approximate line Fig. showing the appearance of the camera one apparatus digital recording regenerative apparatus which can apply this invention.

[Drawing 3] It is the approximate line Fig. showing the example of 1 configuration of a QuickTime movie file.

[Drawing 4] It is the approximate line Fig. showing the example of 1 configuration of a video media information atom.

[Drawing 5] It is the approximate line Fig. showing an example of the index file created using a QuickTime movie file.

[Drawing 6] It is the approximate line Fig. showing an example of a truck atom (property).

[Drawing 7] It is the approximate line Fig. showing an example of the live data of a property.

[Drawing 8] It is the approximate line Fig. showing the example of the layered structure

of a part of property information, a file, and a folder.

[Drawing 9] It is the approximate line Fig. showing the configuration of an index file, and some examples of property information.

[Drawing 10] It is the approximate line Fig. showing an example which registers the contents of one flag by entry #2.

[Drawing 11] It is the approximate line Fig. showing other examples which register the contents of one flag by entry #8.

[Drawing 12] It is the approximate line Fig. showing an example which registers the contents of two flags by entry #2.

[Drawing 13] It is the approximate line Fig. showing the example of the layered structure of a part of property information containing a flag, a file, and a folder.

[Drawing 14] It is the approximate line Fig. used for explanation of the property information which shows the reference relation of a file.

[Drawing 15] It is the approximate line Fig. used for explanation of an example of processing of the property information at the time of deletion of a file.

[Drawing 16] It is the approximate line Fig. used for explanation of other examples of processing of the property information at the time of deletion of a file.

[Drawing 17] It is the flow chart used for explanation of processing of the property information at the time of deletion of a file.

[Drawing 18] It is the flow chart used for explanation of the processing at the time of the entry addition of a file.

[Drawing 19] It is the approximate line Fig. used for explanation of an example of the processing at the time of the entry addition of a file.

[Drawing 20] It is the approximate line Fig. used for explanation of other examples of the processing at the time of the entry addition of a file.

[Description of Notations]

11 ... A video encoder, 12 ... An audio encoder, 13 ... Video decoder, 14 ... An audio decoder, 15 ... A file-generating machine, 16 ... File decoder, 17 20 ... Memory, 18 ... A memory controller, 19 ... System control microcomputer, 21 ... An error correction sign / decoder, 23 ... Data modulator and demodulator, 24 ... Field modulation driver, 26 [... Field head,] ... A control unit, 30 ... A servo circuit, 31 ... A motor, 32 33 ... An optical pickup, 40 ... Record medium 50 ... Camera one apparatus digital recording regenerative apparatus, 51 [... Display panel,] ... A body, 52 ... The lens section, 53 ... A sound-collecting microphone, 54 55 [... A property, 232 / ... A text, 233 / ... A thumbnail, 234 / ... Intro] ... A pointing device, 201 ... An index atom, 202 ... An index data atom, 231

CORRECTION OR AMENDMENT

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[Procedure revision]

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[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] It is the recording device which generates an index file and recorded the above-mentioned index file on the record medium by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined,
Each attribute information on one or more [above] files is held in the above-mentioned index data,
The recording device with which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.
[Claim 2] In claim 1,
The recording device characterized by one unit of the above-mentioned system information registering one convention of the above-mentioned attribute information.
[Claim 3] In claim 1,
The recording device with which one unit of the above-mentioned system information is characterized by registering two or more conventions of the above-mentioned attribute information.
[Claim 4] In claim 1,
The recording device characterized by setting up beforehand 1 or two or more conventions of the above-mentioned attribute information.
[Claim 5] In claim 1,
The recording device characterized by 1 or two or more conventions of the above-mentioned attribute information being set up by the user.
[Claim 6] In claim 1,
The above-mentioned system information is a recording device characterized by recording the text relevant to the above-mentioned attribute information including text information.
[Claim 7] In claim 1,
The above-mentioned system information is a recording device characterized by recording the image relevant to the above-mentioned attribute information including

contraction image information.

[Claim 8] It is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined,

Each attribute information on one or more [above] files is held in the above-mentioned index data,

The record approach by which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 9] In claim 8,

The record approach characterized by one unit of the above-mentioned system information registering one convention of the above-mentioned attribute information.

[Claim 10] In claim 8,

The record approach that one unit of the above-mentioned system information is characterized by registering two or more conventions of the above-mentioned attribute information.

[Claim 11] In claim 8,

The record approach characterized by setting up beforehand 1 or two or more conventions of the above-mentioned attribute information.

[Claim 12] In claim 8,

The record approach characterized by 1 or two or more conventions of the above-mentioned attribute information being set up by the user.

[Claim 13] In claim 8,

The above-mentioned system information is the record approach characterized by recording the text relevant to the above-mentioned attribute information including text information.

[Claim 14] In claim 8,

The above-mentioned system information is the record approach characterized by recording the image relevant to the above-mentioned attribute information including contraction image information.

[Claim 15] It is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined,

Each attribute information on one or more [above] files is held in the above-mentioned

index data,

The program for making a computer perform the record approach by which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 16] It is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined,

Each attribute information on one or more [above] files is held in the above-mentioned index data,

The record medium which recorded the program for making a computer perform the record approach by which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information and in which computer reading is possible.

[Claim 17] In the image pick-up equipment which records the picture signal which may have had the image of a photographic subject photoed on a record medium,

By relating with each of the live data of one or more [above] files the index data concerning each of one or more files recorded on the record medium, and holding them in the form of predetermined, an index file is generated and it has the index recording device which recorded the above-mentioned index file on the record medium,

Each attribute information on one or more [above] files is held in the above-mentioned index data,

Image pick-up equipment with which the above-mentioned index file has system information in addition to the above-mentioned index data, and the above-mentioned system information specified the above-mentioned attribute information.

[Claim 18] It is the recording device which generates an index file and recorded the above-mentioned index file on the record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined,

or [that the number currently referred to from other files which show the reference relation of the above-mentioned multiple files to the above-mentioned index data, the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file are effective] -- the recording device which held reference relational data including the information on an invalid.

[Claim 19] It is the record approach which generates an index file and recorded the above-mentioned index file on the record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, or [that it is effective in the number currently referred to from other files which show the reference relation of the above-mentioned multiple files to the above-mentioned index data, the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file] -- the record approach which held reference relational data including the information on an invalid.

[Claim 20] It is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, or [that it is effective in the number currently referred to from other files which show the reference relation of the above-mentioned multiple files to the above-mentioned index data, the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file] -- the program for making a computer perform the record approach which held reference relational data including the information on an invalid.

[Claim 21] It is the record approach which generates an index file and records the above-mentioned index file on a record medium by relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, or [that it is effective in the number currently referred to from other files which show the reference relation of the above-mentioned multiple files to the above-mentioned index data, the information which specify the file which is referring to the file, the information on whether the file is referring to other files, and its file] -- the record medium which recorded the program for making a computer perform the record approach which held reference relational data including the information on an invalid and in which computer reading is possible.

[Claim 22] In the image pick-up equipment which records the picture signal which may have had the image of a photographic subject photoed on a record medium, By relating with each of the live data of the above-mentioned multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined, an index file is generated and it has the index recording device which recorded the above-mentioned index file on the record medium,

or [that it is effective in the number currently referred to from other files which show the reference relation of the above-mentioned multiple files to the above-mentioned index data, the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file] -- the image pick-up equipment which held reference relational data including the information on an invalid.

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] 0012

[Method of Amendment] Modification

[Proposed Amendment]

[0012] Invention of claim 18 generates an index file by relating with each of the live data of multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined. It is the recording device which recorded the index file on the record medium. The number currently referred to from other files which show the reference relation of multiple files to index data, or [that the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file are effective] -- it is the recording device which held reference relational data including the information on an invalid. or [that the number currently referred to from other files which show the reference relation of multiple files to index data, the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file of invention of claim 19 are effective] -- it is the record approach which held reference relational data including the information on an invalid.

[Procedure amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0013

[Method of Amendment] Modification

[Proposed Amendment]

[0013] Invention of claim 20 generates an index file by relating with each of the live data of multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined. Are the record approach which records an index file on a record medium, and the reference relation of multiple files is shown in index data. The number currently referred to from other files, the information which specifies the file which is referring to the file, or [that the information on whether the file is referring to other files and its file are effective] -- it is

a program for making a computer perform the record approach which held reference relational data including the information on an invalid. Invention of claim 21 is a record medium which recorded such a program and in which computer reading is possible.

[Procedure amendment 4]

[Document to be Amended] Specification

[Item(s) to be Amended] 0014

[Method of Amendment] Modification

[Proposed Amendment]

[0014] In the image pick-up equipment which records the picture signal with which invention of claim 22 may have had the image of a photographic subject photoed on a record medium An index file is generated by relating with each of the live data of multiple files the index data concerning each of the multiple files recorded on the record medium, and holding them in the form of predetermined. It has the index recording device which recorded the index file on the record medium. The number currently referred to from other files which show the reference relation of multiple files to index data, or [that the information which specifies the file which is referring to the file, the information on whether the file is referring to other files, and its file are effective] -- it is image pick-up equipment which held reference relational data including the information on an invalid.